

## IA - 5.2 Measuring pollution

(Data collection and processing; Discussion, Evaluation and Conclusion)

Your aim is to test a river at different locations to assess pollution levels.

This will be done using a biotic index measuring the number, variety and tolerance levels of biotic communities in the water. The *Stream Pollution Index* can be calculated.

You can work in groups on the day to collect your data but must ensure that your write-up is an individual piece of work.

Use the variety of information sheets given to you plus any other resources you find, to do the following:

1) Prepare your data collection sheets. You should refer to the 'How to calculate the health of your site' sheet to ensure that you are going to collect all relevant data to work out the *Stream Pollution Index*.

Ensure that you have space on your data collection sheets for at least two test samples at each site on the river (you will probably test two/ three river sites)

After obtaining your results:

- 2) *Calculate* the Stream Pollution Index (SPI) for each kick-sample. Then calculate the average SPI for each site using all data collected by the group.
- 3) *Describe* the overall pattern of your results. Mention any anomalies.
- 4) *Explain* the patterns you have just described. Use any observations made on the day, plus any helpful theory from your texts and other sources to suggest explanations for the results (including anomalies).
- 5) Write an *evaluation* of the study, identifying strengths and weaknesses and suggesting realistic improvements.

### *Do oxygen levels in the water affect animal Biodiversity?*

Aim: Do oxygen levels in the water affect animal biodiversity?

Hypothesis: as oxygen levels in the water decrease, animal biodiversity will decrease as well

Dependent Variables: animal biodiversity

Independent Variables: oxygen levels

Control Variables:

- Flow rate
- Distance from source
- Area (size)
- Time (season)

Materials:

- Oxygen probe
- Nets
- Sample bottles
- water jugs
- ID keys

Method:

- Use the oxygen probe to measure the level of oxygen
- Use rock kicking method to catch organisms
- Record:
  - Number of different organisms
  - Number of each organism
  - Site and sample numbers
- Use The Simpsons Diversity Index:
  - $D = N(N-1) / \sum n(n-1)$
  - D= diversity index\
  - N=total number of organisms counted in the sample o n=number of individuals of a particular species
  - $\sum$ =sum of
- Compare the oxygen levels to the animal diversity and see if there is a relationship between them
- Repeat two more times so there are at least three samples